REVIEW PLAN

October 11, 2019

1. OVERVIEW

This review plan (RP) defines the scope and level of peer review for the following study:

- **Study Name:** South Atlantic Coastal Study (SACS)
- **P2 Number:** 46376
- **Federal Project:** N/A
- **Document Type:** Other Work Product (Report)
- **Project Type:** Coastal Storm Risk Management
- **Congressional Approval Required (Yes/No):** No
- **District:** Regional: South Atlantic Division
- **Major Subordinate Command (MSC):** South Atlantic Division (CESAD)
- **Review Management Organization (RMO):** Planning Center of Expertise for Coastal Storm Risk Management (PCX-CSRM)
- **Review Plan Contacts:**
  - **Regional Team:** Project Manager (910) 251-4671
  - **MSC:** District Support Team Lead (404) 562-5224
  - **RMO:** PCX-CSRM Review Manager (347) 370-4571

2. KEY REVIEW PLAN DATES

Table 1: Key Review Plan Dates

Action	Date - Actual[1]
RMO Endorsement of RP	16 Apr 19
MSC Approval of RP	TBD
IEPR Exclusion Approval	TBD
Has RP changed since PCX endorsement?	NA
Last RP revision	NA
RP posted on District Website	TBD
Congressional notification	NA

3. MILESTONE SCHEDULE

Table 2: Milestone Schedule

Action	Date - Scheduled	Date – Actual	Status – Complete?
Agreement Signed	NA	NA	NA
Shared Vision Milestone	21 August 2019	20 August 2019	Yes
Recommendations Milestone	24 August 2021	TBD	No
Report Milestone	22 October 2021	TBD	No
Approval of Final Watershed Plan	18 August 2022	TBD	No

4. BACKGROUND

- **Date of 'Background' Information**: October 2019

- **RP References:**
  - Engineer Circular (EC) 1165-2-217, Review Policy for Civil Works, 20 February 2018
  - EC 1105-2-412, Assuring Quality of Planning Models, 31 March 2011
  - Engineer Regulation (ER) 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 November 2007
  - Director's Policy Memorandum Civil Works (DPM CW) Programs 2018-05, Improving Efficiency and Effectiveness in USACE Civil Works Project Delivery (Planning Phase and Planning Activities), 3 May 2018
  - Director of Civil Works (DCW) Memorandum, Revised Delegation of Authority in Section 2034(a)(5)(A) of the Water Resources Development Act (WRDA) of 2007, as amended (33 U.S.C. 2343),
  - 7 June 2018 Implementation Guidance dated November 16th, 2017 (SUBJECT: Implementation Guidance for Section 1204 of the Water Resources Development Act of 2016 (WRDA 2016), South Atlantic Coastal Study); includes 75%/25% cost sharing and direction to follow planning guidance applicable to watershed assessments with integrated NEPA as appropriate.
  - P.L 115-123: provided for 100% Federal funding for study completion
  - South Atlantic Division Quality Management Plan

- **Authority**: Authorization for the SACS can be found in Section 1204 of WRDA 2016:

(a) IN GENERAL-The Secretary shall conduct a study of the coastal areas located within the geographical boundaries of the South Atlantic Division of the Corps of Engineers to identify the risks and vulnerabilities of those areas to increased hurricane and storm damage as a result of sea level rise.

(b) REQUIREMENTS.- ln carrying out the study under subsection (a), the Secretary shall-

(1) conduct a comprehensive analysis of current hurricane and storm damage reduction measures with an emphasis on regional sediment management practices to sustainably maintain or enhance current levels of storm protection;
(2) identify risks and coastal vulnerabilities in the areas affected by sea level rise;
(3) recommend measures to address the vulnerabilities described in paragraph (2); and
(4) develop a long-term strategy for-
(A) addressing increased hurricane and storm damages that result from rising sea levels; and
(B) identifying opportunities to enhance resiliency, increase sustainability, and lower risks in-
(i) populated areas;
(ii) areas of concentrated economic development; and

(iii) areas with vulnerable environmental resources.

This authorization also requires the Secretary to report to Congress within four years after enactment of WRDA 2016 with specific and detailed recommendations to address those risks and vulnerabilities of the areas described in subsection (a). Accordingly, the study timeline will follow a four year path to approval of the final report, with study initiation marked by receipt of funding by the RSM-CX.

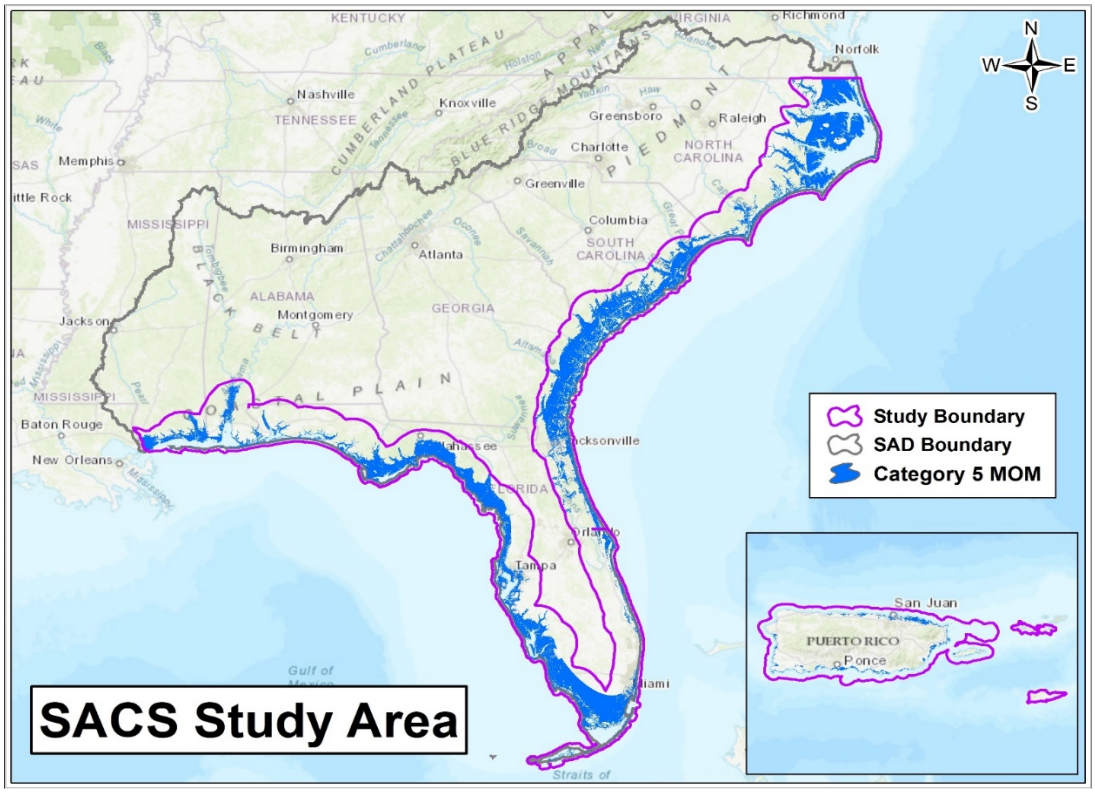
- **Sponsor**: There is no non-Federal sponsor for this study. Public Law 115-123 provided for 100% Federal funding for the study in the amount of $16M. MEMORANDUM FOR Deputy Commanding General for Civil and Emergency Operations, SUBJECT: Policy Guidance on Implementation of Supplemental Appropriations in the Bipartisan Budget Act of 2018, dated August 9, 2018, waived the requirement for a cost sharing agreement for the SACS.

- **SMART Planning Status**: The study is being executed in accordance with SMART Planning principles; however, study cost and delivery schedule are not consistent with 3x3x3. Total authorized study budget is $16M, and in accordance with the above-referenced authorizing language, the final report will be approved by the MSC in 4 years.

- **Location:** The study area (Figure 1) includes the three distinct coastal regions within SAD's area of responsibility: The Atlantic Coast, Gulf Coast, and those areas in the Caribbean to include Puerto Rico and the United States Virgin Islands (USVI) under the SAD's Civil Works Area of Responsibility.

- **Problem Statement**: The impacts from recent major hurricanes highlighted the national need for a comprehensive and collaborative evaluation to reduce risk to vulnerable populations within the tidally influenced areas of the South Atlantic Division Area of Responsibility (AOR). The study shall be modeled after the North Atlantic Coast Comprehensive Study (NACCS) completed by the U.S. Army Corps of Engineers in 2015 and bring to bear the latest scientific information available for vulnerable areas along the South Atlantic Coast, Gulf Coast, Puerto Rico, and the US Virgin Islands (USVI).

Figure 1: Study Area



- **Study/Project Goals and Objectives**: The South Atlantic Coastal Study (SACS) will provide a common operating picture of coastal risk and identify potential risk management alternatives with the goal of addressing increased hurricane and storm damages that result from rising sea levels. The following planning objectives have been identified to guide the study on a path to achieve this overall vision:

  (1) **Provide a Common Operating Picture of Coastal Risk** – Provide decision makers at Federal, state and local levels with a comprehensive and consistent regional assessment of coastal risk.
  (2) **Identify High-Risk Locations and Focus Current and Future Resources** – Enable resources to be focused on the most vulnerable areas.
  (3) **Identify and Assess Risk Reduction Measures** – Assess projects and/or actions that would reduce risk to vulnerable coastal areas.
  (4) **Promote and Support Resilient Coastal Communities** – Ensure a sustainable and robust coastal landscape system, considering future sea level rise scenarios and climate change. Provide information to stakeholders to optimize existing efforts to reduce risk to vulnerable populations, property, ecosystems and infrastructure.
  (5) **Promote Sustainable Projects and Programs** – Outline and establish priorities for regionally managing projects through Regional Sediment Management and other opportunities which support conservation of natural and fiscal resources.

(6) Leverage Supplemental Actions – Multiple studies and construction efforts funded by the Bipartisan Budget Act of 2018 (Public Law 115-123) will inform, and be informed by, the SACS.

- **Description of Action:** The SACS report is an Other Work Product. It will not formulate or recommend specific projects for authorization or appropriation. Study recommendations will consist of actionable strategies to buy down risk for vulnerable populations within the study area; these actionable strategies may include participation by the USACE or other Federal agencies, as well as actions that leverage non-Federal capabilities, authorities, and partnerships.

- **Federal Interest**: The SACS will be designed to help local communities better prepare, absorb, recover and adapt to changing conditions, becoming more resilient as they better understand how future flood risks may evolve in response to the effects of climate change, demographic shifts, and environmental conditions. The study will provide a regional risk assessment and the tools to help those communities better prepare for future flood risks. As the NACCS was a significant effort initiated in response to a devastating storm event, the SACS will take a proactive approach in identifying regional risk and conceptual measures to better prepare the region before the next major event impacts the coast. Sustainable practices that include regional sediment management leveraging existing project and program actions will be identified to highlight opportunities for immediate efficiencies in addressing current and future storm risk. Leveraging existing actions will provide a real-time enhancement of the region's capability to withstand, respond to and recover from future events in that it is a proactive effort (in consideration of the effects of climate change on sea level change and associated wave and water levels) and that it incorporates sustainability through regional sediment management (RSM) and other management practices. Federal interest in participating in the study exists because the study will increase resiliency to coastal storms.

- **Risk Identification:** The SACS will provide a common operating picture of coastal risks and identify potential risk management alternatives with the goal of developing a sustainable and robust coastal landscape system. Study products will include a framework to reduce risk and increase resiliency to populations in tidally influenced areas of the SAD AOR affected by hurricanes and coastal storms as well as climate change and sea level fluctuations. This framework will be accompanied by detailed state appendices that address actions to optimize risk reduction, sustainability and coastal resiliency within high risk portions of the state/territory coastal areas under a future impacted by climate change variation. Various technical appendices will provide additional detailed information to support robust decision making.

5. FACTORS AFFECTING THE SCOPE AND LEVEL OF REVIEW

EC 1165-2-217 indicates that for 'other work products', a case-specific, risk-informed decision is made as to whether ATR is appropriate. The following questions are utilized to support a risk-informed decision relative to level of review:

(1) Does it include any design (structural, mechanical, hydraulic, etc)?
- No; although the SACS will identify conceptual strategies appropriate for regional risk reduction within the study area, these strategies will not be formulated or analyzed to a level of detail that includes any design-level considerations.

(2) Does it evaluate alternatives?
- No; the SACS will discuss options associated with risk reduction measures and strategies that are available to stakeholders, including the USACE, for consideration in follow-on studies or project efforts. SACS products will not evaluate specific alternatives relative to identification of Federal, or other, interest or economic justification to be used for decision-making purposes.

(3) Does it include a recommendation?
- Yes, although no project-specific recommendations based on identified Federal interest will be put forward; authorizing language for the the SACS contained in Section 1204 of WRDA 2016 charges the study with recommending measures to address the vulnerabilities in areas within the study boundary affected by sea level rise, and developing a long-term strategy for associated increased hurricane and storm damages. These recommendations will be focused on identification of partering opportunities; follow-on planning studies; modification of identified institutional constraints to effective regional risk reduction; refinements to existing O&M projects that could be considered within the context of the current project authorizations; and potentially effective risk reduction measures that could be considered by others entities in post-SACS planning efforts. The SACS will not include project-level recommendations for traditional Congressional authorization and/or appropriation.

(4) Does it have a formal cost estimate?
- No, as the SACS does not formulate, evaluate of recommend a specific project for Congressional a uthorization. There will be no formal cost estimates developed for project implementation in the SACS. However, the SACS Measures and Cost Library will develop parametric costs on a planning-reach basis for use by plan formulators in the assessment and screening of preliminary alternatives in traditional feasibility studies. Requirements for review and approval of this product are being coordinated through the Cost MCX and SAD as a product ultimately to be issed to the districts from SAD.

(5) Does it have or will it require a NEPA document?

- No; although the SACS will consider the risk and vulnerability of sensitive environmental resources to sea level rise, recommendations will not require a NEPA document.

(6) Does it impact a structure or feature of a structure whose performance involves potential life safety risks?

- No; the SACS will not propose any specific project actions that will impact structures whose performance involves life-safety risk.

(7) What are the consequences of non-performance?

- Not Applicable; as the SACS does not recommend projects for implementation, non-performance considerations are not applicable.

(8) Does it support a significant investment of public monies?

- Yes; SACS recommendations could, if implemented, result in a considerable investment of public monies if those recommendations were pursued. Some of the SACS recommendations will likely involve potential USACE follow-on actions, and some will likely involve public monies associated with other Federal and non-federal agencies. As there are no project-specific recommendations being generated, there is no significant investment of public monies in follow-on construction.

(9) Does it support a budget request?

- Potentially Yes; as indicated above, interim and final SACS recommendations could result in budget requests associated with planning and design efforts for refinement of existing CSRM projects; regional sediment management actions/opportunities, and other actions that could arise from study findings.

(10) Does it change the operation of the project?

- Not Applicable; there is no specific project being impacted or studies within the SACS.

(11) Does it involve excavation, subsurface investigations (drilling or sampling or both), or placement of soil?

- No; the SACS does not involve any fieldwork associated with drilling or sampling.

(12) Does it affect any special features, such as cultural resources, historic properties, survey markers, etc., that should be protected or avoided?

- No; SACS recommendations will not result in any ground-disturbing activities that will affect cultural resources, historic properties, survey markers, etc. Follow-on planning and design efforts will address these project-related impacts if and when a

stakeholder decision is made to pursue implementation of SACS recommendations.

(13) Does it involve activities that trigger regulatory permitting; for example: activities covered by Section 404 of the Clean Water Act or stormwater-related actions requiring a National Pollution Discharge Elimination System (NPDES) permit?

- No; as stated above, SACS recommendations will not result in any ground-disturbing activities that will trigger regulatory permitting. Stakeholder decisions to pursue implementation of SACS recommendations may ultimately involve regulatory permitting, abd would be the responsibility of the stakeholder to complete.

(14) Does it involve activities that could potentially generate hazardous wastes and/or disposal of materials such as lead based paints or asbestos?

- No; SACS is not undertaking any fieldwork or construction that could potentially generate hazardous waste and/or disposal of hazardous materials.

(15) Does it reference use of or reliance on manufacturers' engineers and specifications for items such as prefabricated buildings, playground equipment, etc.?

- No; The SACS does not reference, rely or in other way utilize construction materials or associated specifications.

(16) Does it reference reliance on local authorities for inspection/certification of utility systems like wastewater, storm water, electrical, etc.?

- No; the SACS will not involve the construction of utility systems.

(17) Is there or is there expected to be any controversy surrounding the Federal action associated with the work product?

- No; the SACS is not proposing any specific Federal actions. Study recommendations, if supported for implementation, will involve follow-up study and design as appropriate. Controversy associated with those actions will be handled during specific project planning and design.

DECISION ON ATR: The SACS will contain complex analyses and recommendations relative to risk identification, resilience strategies, and measures to address future vulnerability. Therefore all SACS products will undergo ATR.

6. REVIEW EXECUTION PLAN

This section provides a general description of each type of review and identifies the reviews anticipated for this study.

A. Types of Review

1) **District Quality Control (DQC).** DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements of the project management plan. All decision documents (including data, analyses, environmental compliance documents, etc.) undergo DQC review. Additionally, DQC will be conducted on technical products during their development, and will be completed prior to the Recommendations milestone meeting (Planning Bulletin 2019-01, Watershed Studies). Although the SACS is not considered a decision document, all study products will undergo a thorough and documented DQC. A rolling DQC for the Coastal Hazard System (CHS) will be conducted by the study team as CHS interim products are developed and documented in DRCHECKS.

2) **Agency Technical Review (ATR).** ATR is performed to assess whether study analyses are technically correct and comply with USACE guidance and whether documentation explains the analyses and results in a clear manner. Further, the ATR team will ensure that proper and effective DQC has been performed (as assessment of which will be documented in the ATR report) and will ensure that the product is consistent with established criteria, guidance, procedures, and policy. Although ATR is mandatory for all decision and implementation documents, for 'Other Work Products' a case-specific, risk-informed decision is made as to whether ATR is appropriate. EC1165-2-217 utilizes the questions contained in Section 4 above to support a risk-informed decision relative to conduct of ATR . PB 2019-01 also states that ATR will be conducted on technical products, models or analyses that are particularly complex to assure the quality and credibility of the scientific information, prior to the Recommendations milestone meeting.

   The SACS will contain complex analyses and recommendations relative to risk identification, resilience strategies, and measures to address future vulnerability. EC1165-2-217 stipulates that ATR for 'other work products' must have appropriate coordination and processing through CoPs, relevant PCXs, and other relevant offices to ensure that a review team with appropriate independence and expertise is assembled and a cohesive and comprehensive review is accomplished. Given the regional implications of study findings relative to Federal and non-federal planning and risk reduction efforts, and the anticipated widespread application of SACS study products to include, but not be limited to, the Measures and Cost Library, Coastal Hazard System, Sand Availability and Needs Determination (SAND), Tier 1 risk assessment, and state and territory appendices, all SACS products will undergo ATR and involve all relevant CoPs, PCXs and expertise. Rolling ATR of technical products is planned for:

   - SAND: ATR of contractor-generated products

- Coastal Hazard System: review of the Coastal Hazard System (CHS) will occur by means of a rolling review of interim CHS products by a technical oversight committee, in addition to rolling peer review of all CHS products by Dewberry consultants. Comments and responses are captured in DRCHECKS.
- Measures and Cost Library: ATR of the Measures and Cost Library will occur, in close coordination with SAD.
- ATR of the High Rise Damage Estimation study product will also be conducted by the SME on the ATR team as an interim deliverable.

The Main CSRM Framework Report and all state and territory appendices will undergo a thorough ATR.

3) **Independent External Peer Review/External Subject Matter Expert Review.** Type I IEPR is conducted on project studies (decision documents), and Type II IEPR (Safety Assurance Review) is conducted on design and construction activities for any project where potential hazards pose a significant threat to human life (public safety). As the SACS is an 'other work product' and not a decision document, Type I IEPR is not required. Study recommendations will not involve design or construction, therefore Type II IEPR is not required.

   However, the draft SACS main report and appendices will be reviewed by a panel of external subject matter experts (SMEs), and their feedback incorporated into report finalization. Attachment 1 contains a potential roster of SMEs, subject to change upon recommendation of additional participants and/or confirmation of availability.

4) **Cost Engineering Review**. Policy requires that all decision documents will be coordinated with the Cost MCX. As it is not a decision document, the SACS will not generate project-specific cost estimates requiring certifications, however, the Measures and Cost Libray will contain parametric costs for risk reduction measures within each planning reach of the study area. These costs will be utilized to streamline and facilitate the screening of preliminary alternatives within other USACE feasibility studies, and other planning studies conducted by agency partners and non-federal stakeholders. District cost engineers will be part of the PDT developing these costs, and DQC will be conducted on the draft report product by each district. The Cost MCX will participate in ATR of the draft Measures and Cost Library documentation, and validate parametric cost accordingly.

5) **Model Review and Approval/Certification.** Engineer Circular (EC) 1105-2-412 established the process and requirements for ensuring the quality of planning models. The EC mandates use of certified or approved planning models for all planning activities to ensure that planning products are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions regarding the availability of data, transparent, and described in sufficient detail to address any limitations of the model or its use. Models anticipated for use in the SACS and their status are discussed below in section G.

6) **Policy and Legal Compliance Reviews.** Although not a decision document, SACS products will undergo policy and legal compliance review to ensure consistency with applicable law and policy pertaining to the study as an 'other work product'. ER 1105-2-100, Appendix H, and DPM CW/DCW memos, provide guidance on policy and legal compliance reviews. These reviews for the SACs will culminate in a determination of whether report contents, conceptual recommendations, supporting analyses, and coordination comply with law and policy associated with the scope of the study.

7) **Public Review.** The home District (SAJ) will post the RMO endorsed and MSC approved RP on the District's public website. Internet posting of the RP provides opportunity for the public to comment on that document. It is not considered a formal comment period, and there is no set timeframe for public comment. The PDT should consider any comments received and determine if RP revisions are necessary.

   The draft Framework report and appendices will not undergo traditional public review accompanied by formal public noticing, but will be made available on the study web site for a minimum of thirty (30) days for public review and comment once complete. In-person workshops will be scheduled in each state/territory if study funding is available to obtain direct public input. Comments received on the draft report, either in writing via the study email/web site or at in-person workshops, will be considered and incorporated into the final report, as appropriate.

B. Anticipated Study Reviews and Estimated Costs

Table 3 below provides the estimated schedule and cost for reviews anticipated for this study.

Table 3: South Atlantic Coastal Study – Anticipated Reviews

Product to Undergo Review	Review	Start Date	End Date	Cost	Complete
Draft Framework Main Report and State/Territory Appendices	District Quality Control	07/19/21	08/16/21	$65,000	No
	Agency Technical Review	11/15/21	12/13/21	$75,000	No
	External SME Review	11/15/21	12/13/21	$0	No
	Policy and Legal Review	11/15/21	12/13/21	N/A	No
Final Framework Main Report and state/Territory Appendices	District Quality Control	03/21/22	04/18/22	$45,000	No
	Agency Technical Review	05/23/22	06/20/22	$50,000	No
Coastal Hazard System	District Quality Control	rolling	rolling	$10,000	No
	Agency Technical Review	rolling	rolling	$50,000	No
	SME QA/QC	rolling	rolling	$75,000	No
Measures and Cost Library	District Quality Control	05/10/20	05/24/20	$10,000	No
	Agency Technical Review	06/07/20	06/26/20	$40,000	No

C. District Quality Control

The SACS CSRM Framework Report and associated State/Territory appendices will be compiled by a contractor. The SACS Command Team will provide text for the report, and complete a top-to-bottom DQC of the entire report package. Each district PDT shall oversee DQC of the CSRM Framework Report and the state/territory appendix(s) for which they are responsible. A DQC Lead will be identified to in each district to oversee that review (see EC 1165-2-217, section 8.a.1).

DQC of the technical SACS producst including CHS, SAND, and the Measures and Cost Library will consist of technical team review (Command Team Lead with district POCs).

1) **Review Team Expertise.** Table 4 identifies the required DQC team expertise.

Table 4: Required DQC Expertise

DQC Team Disciplines	Expertise Required
DQC Lead	The DQC lead will be a senior professional with extensive experience preparing Civil Works decision documents and conducting quality control reviews. The lead should have the skills to coordinate an interdisciplinary team through a complex review. The lead may serve as a reviewer for a specific discipline (e.g., plan formulation, economics, etc.).
Plan Formulation	The planning reviewer should be a senior water resources planner with experience in multi-purpose projects and formulation of creative strategies that may extend beyond USACE authorities.
Economics	The economics reviewer should be a senior level economist with a broad range of experience in applying multifaceted economic analysis to the derivation of creative strategies for risk reduction, and the benefits and costs associated with coastal storm risk management.
Risk	The risk analysis reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other related guidance, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results.
Environmental Resources	The environmental reviewer will be a senior environmental scientist with expertise in coastal storm risk management studies, biology, ESA and critical habitat considerations particularly relative to tidal wetlands and resources.
HH&C Engineer	The HH&C engineer will be a senior level HH&C reviewer with expertise in design and construction of coastal storm risk management measures. The reviewer should also have familiarity with technical and policy considerations relative to climate change and sea level rise. Ability to review application

	of model outputs associated with ADCIRC and STWAVE and other engineering models is required.
Cost Engineer	The cost reviewer will be a senior cost engineer with expertise in coastal storm risk management projects.
Real Estate	A senior reviewer familiar with real estate requirements associated with coastal storm risk management projects.

2) **Documentation of DQC**. Quality Control will be performed continuously throughout the study. Certification of DQC completion will be documented at the draft and final report stages. Documentation of DQC will follow each District Quality Manual and the MSC Quality Management Plan. DrChecks software will be used to document DQC review comments, responses, and issue resolution.

   Documentation of the completed DQC review (i.e., all comments, responses, issue resolution, and DQC certification) will be provided to the MSC, RMO, and ATR Team leader prior to initiating an ATR. The ATR team will assess the quality of the DQC performed and provide a summary of that assessment in the ATR report. Missing or inadequate DQC documentation can result in the start of subsequent reviews being delayed (see EC 1165-2-217, Section 9).

D. Agency Technical Review

As discussed above, ATR will be performed on the draft and final reports as well as technical appendices and supporting analyses (EC 1165-2-217, paragraph 9.i.(3)). The RMO will manage the ATR. ATR will be performed by a qualified team from outside the home district that is not involved in the day-to-day production of the study/product. ATR will be performed by a team whose members are certified or approved by their respective Communities of Practice (CoPs) to perform reviews. The RMO will identify an ATR lead and ATR team members. Neither the home District nor the MSC will nominate review team members. The ATR team lead will be from outside the home MSC. The ATR team lead is expected to participate in the study's milestone meetings (PB 2018-01), the cost of which is not included in the estimates provided in Table 1.

The SACS CSRM Framework Report and associated State/Territory appendices will be subject to ATR, comprised of the discipline expertise as indicated below. The SACS Measures and Cost Libray ATR team will consist of the same disciplines. ATR of the SAND product will be comducted by a Regional Sediment Management team member, and a Geotechnical team member. CHS ATR is being conducted by contract.

1) **Review Team Expertise.** Table 5 identifies the anticipated disciplines and ATR team expertise required for study efforts.

Table 5: Required ATR Team Expertise

ATR Team	Expertise
ATR Lead	The ATR lead will be a senior professional with extensive experience in preparing civil works documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc.).
Planning	The Planning reviewer will be a senior water resources planner with experience in the formulation aspect of coastal flood risk management studies.
GIS/Geospatial Specialist	The GIS Geospatial reviewer will be a senior cartographer, geographer, or engineer with experience completing various geospatial applications in support of USACE civil and military missions using ESRI ArcInfo software products. The reviewer should have experience managing extensive geodatabases and combining various spatial data from various sources to store in personal geodatabase format. The reviewer should also have experience creating rasters or grids from vector format as well as raster analyses associated with 3D and spatial analyst tools.
Economics	The Economics reviewer will be a senior level economist with experience in evaluating the benefits and costs associated with a coastal flood risk management study, including the use of Hazus-MH and/or G2CRM.
Environmental Resources	The Environmental reviewer will be a senior biologist or ecologist with experience in with flood risk management studies, especially tidal wetland enhancement. The reviewer should also have expertise in NEPA compliance and impacts assessment.
Cultural Resources	The Cultural Resources reviewer will be a senior archaeologist.

Hydrology, Hydraulics, and Coastal (HH&C) Engineering	The HH&C engineering reviewer will be a senior level HH&C engineer with experience associated with design and construction of hurricane and storm damage risk reduction projects, including levees, floodwalls, retaining walls, pump stations, gate well structures, utility penetrations, stop log and sandbag gaps and other closure structures, interior drainage, drainage structures, etc. The reviewer must be experienced in computer modeling techniques for storm and wave analysis modeling such as ADCIRC and STWAVE, sediment transport, as well as sea level change policy requirements.
Risk Analysis	The risk analysis reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other related guidance, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results.
Civil Engineering	The Civil Engineering reviewer will be a senior civil engineer familiar with structural and nonstructural coastal flood risk management measures.
Cost Engineering	The Cost Engineering reviewer will be a senior cost engineer.
Real Estate	The Real Estate representative will be a senior realty specialist with experience in the real estate requirements for coastal storm management projects.
Climate Preparedness and Resilience	The Climate Preparedness and Resilience reviewer will be a senior reviewer with expertise in the analysis of climate change scenarios and sea level rise

2) **Documentation of ATR.** DrChecks will be used to document ATR comments, responses, and issue resolution. Comments should be limited to those needed to ensure product adequacy. All members of the ATR team should use the four part comment structure (EC 1165-2-217, Section 9(k)(1)). If a concern cannot be resolved by the ATR team and PDT, it will be elevated to the vertical team for resolution using the issue resolution process identified in EC 1165-2-217. The comment(s) can then be closed in DrChecks by noting the concern has been elevated for resolution. The ATR Lead will prepare a Statement of Technical Review Report (see EC 1165-2-217, Section 9), for both draft and final decision documents. Any unresolved issues will be documented in the ATR report prior to certification. The Statement of Technical Review (ATR completion) will include signatures from the ATR Lead, Project Manager, and RMO, and the Certification of ATR should always include signatures from the District's Chiefs of Engineering and Planning Divisions.

E. CoP/SME Review

Internal SMEs representing the relevant Communities of Practice (CoP) will be incorporated into rolling QA/QC reviews of interim technical products including the Tier 1 Risk Assessment, Geoportal development, Coastal Hazard System, and Focus Area Damage Estimation/Measures and Cost Library. These rolling reviews will be captured in DRCHECKS as appropriate. CoP SMEs will also be included on technical working group coordination calls at strategic points during the development of technically complex interim products.

F. Independent External Peer Review

Type I IEPR is conducted on project studies (decision documents), and Type II IEPR (Safety Assurance Review) is conducted on design and construction activities for any project where potential hazards pose a significant threat to human life (public safety). As the SACS is an 'other work product' and not a decision document, Type I IEPR is not required. Study recommendations will not involve design or construction, therefore Type II IEPR is not required.

G. Model Certification or Approval

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models are any models and analytical tools used to define water resources management problems and opportunities; to formulate potential alternatives to address study area problems and take advantage of opportunities; to evaluate potential effects of alternatives; and to support decision making. The use of a certified/approved planning model does not constitute technical review of a planning product. The selection and application of the model and assessment of input and output data is the responsibility of the users and is subject to DQC, ATR, and IEPR (if required). The following models may be used to develop the decision document.

Table 6: Planning Models

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Certification / Approval
Regional Economic System (RECONS) (Economics)	RECONS is a regional economic impact modeling tool that estimates jobs, income, sales and value added associated with Corps Civil Works spending and the effects of additional economic activities. The economist on the PDT will use the model to estimate the regional economic impacts of risk reduction strategies.	Certified
G2CRM	The G2CRM is a desktop computer model that implements an object-oriented probabilistic life cycle analysis (PLCA) model using event-driven Monte Carlo simulation (MCS). This allows for incorporation of time-dependent and stochastic event-dependent behaviors such as sea level change, tide, and structure raising and removal. The model is based upon driving forces (storms) that affect a coastal region (study area). The study area is comprised of individual sub-areas of different types that may interact hydraulically and may be defended by coastal defense elements that serve to shield the areas and the assets they contain from storm damage. The model is scalable in that different levels of detail can be used for the data that drives the model, with lower levels of detail at early stages of model application (fewer storms, aggregated assets) and more refined representations used as new data become available.	Approved for Use
HAZUS –MH	**Hazus** is a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. **Hazus** uses Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disasters.	Allowed

EC 1105-2-412 does not address engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue. The professional practice of documenting the application of the software and modeling results will be followed. The USACE Scientific and Engineering Technology Initiative has identified many engineering models as preferred or acceptable for use in studies. These models should be used when appropriate. The selection and application of the model and the input and output data

is the responsibility of the user and is subject to DQC, ATR, and IEPR (if required). The following models may be used to develop the decision document.

Table 7: Engineering Models

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Model Certification / Acceptance Status
ADCIRC	The Advanced Circulation Model (ADCIRC) is a hydrodynamic circulation numerical model that simulates water level and current over an unstructured gridded domain.	Allowed/Preferred
STWAVE	STWAVE (STeady-state spectral WAVE), a nearshore spectral wave model, was developed by the U.S. Army Engineer Research and Development Center (ERDC), Coastal and Hydraulics Laboratory (CHL) to accurately simulate nearshore wave propagation and transformation including refraction, shoaling, breaking, and wind-wave generation.	Allowed/Preferred
WAVEWATCH III	WAVEWATCH III® (Tolman 1997, 1999a, 2009) is a third generation wave model developed at NOAA/NCEP in the spirit of the WAM model (WAMDIG 1988, Komen et al. 1994). WAVEWATCH III® solves the random phase spectral action density balance equation for wavenumber-direction spectra. The implicit assumption of this equation is that properties of medium (water depth and current) as well as the wave field itself vary on time and space scales that are much larger than the variation scales of a single wave.	Allowed/Preferred
SLOSH	The Sea, Lake and Overland Surges from Hurricanes (SLOSH) model is a computerized numerical model developed by the National Weather Service (NWS) to estimate storm surge heights resulting from historical, hypothetical, or predicted hurricanes by taking into account the atmospheric pressure, size, forward speed, and track data. These parameters are used to create a model of the wind field which drives the storm surge.	Allowed
CGWAVE	The model CGWAVE (Demirbilek and Panchang 1998) is a two-dimensional wave transformation	Allowed/Preferred

	model that can be used to predict wave properties (wave heights, velocities, pressures, radiation stresses) in domains of complex shape and depth variations when an input wave condition (amplitude, direction, and period; or a spectral combination of these) is provided.	
XBEACH	XBeach is an open-source numerical model which is originally developed to simulate hydrodynamic and morphodynamic processes and impacts on sandy coasts with a domain size of kilometers and on the time scale of storms.	Allowed
C2SHORE	The cross-shore model C2SHORE was developed predict 2-D beach morphologic evolution on the time scale of storms.	Pending
CSHORE	The cross-shore model CSHORE was developed predict 1-D cross-shore beach profile evolution on the time scale of storms.	Pending
DELFT3D	Delft3D is a 3D modeling suite to investigate hydrodynamics, sediment transport and morphology and water quality for fluvial, estuarine and coastal environments. The Delft3D flow (FLOW), morphology (MOR) and waves (WAVE) modules are available in open source.	Allowed
FUNWAVE	FUNWAVE is a phase-resolving, time-stepping Boussinesq model for ocean surface wave propagation in the nearshore.	Allowed/Preferred
WHAFIS	Wave Height Analysis for Flood Insurance Studies (WHAFIS), Version 4.0, uses representative transects to compute overland wave crest elevations in a given study area. Transects are selected by considering major topographic, vegetative and cultural features. WHAFIS uses this and other input information to compute an appropriate depth-limited wave height at the seaward end of each transect.	Pending
SWAN	SWAN is a third-generation wave model, developed at Delft University of Technology, that computes random, short-crested wind-generated waves in coastal regions and inland waters.	Allowed
MIKE21	MIKE 21 is a computer program that simulates flows, waves, sediments and ecology in rivers, lakes, estuaries, bays, coastal areas and seas in two dimensions.	Allowed
FVCOM	The Finite Volume Community Ocean Model (FVCOM; Formerly Finite Volume Coastal Ocean Model) is a prognostic, unstructured-grid, free-	Allowed

	surface, 3-D primitive equation coastal ocean circulation model.	
POM	The Princeton Ocean Model (POM) is a community general numerical model for ocean circulation that can be used to simulate and predict oceanic currents, temperatures, salinities and other water properties	Pending
ECOMSED	ECOMSED is a three-dimensional hydrodynamic and sediment transport computer code developed by HydroQual for application to marine and freshwater systems.	Allowed
WAM	The WAM model predicts ocean wave characteristics by solving the energy balance equation, including non-linear wavewave interactions.	Allowed/Preferred
Coastal Hazard System	The Coastal Hazards System (CHS) is a coastal storm response data resource. The focus of the product is distribution of regional coastal high-fidelity climatological and hydrodynamic modeling results and associated measurements including storm wind, atmospheric pressure, wave, surge, water level, currents, tropical cyclone parameters, statistics of the above processes, and any other pertinent data.	Allowed/Preferred

H. Policy and Legal Compliance Reviews

Policy and legal compliance reviews for draft and final planning decision documents are delegated to the MSC (see Director's Policy Memorandum 2018-05, paragraph 9).

1) **Policy Review.** The policy review team is identified through the collaboration of the MSC Chief of Planning and Policy and the HQUSACE Chief of the Office of Water Project Review. The team is identified in Attachment 1 of this Review Plan. The makeup of the Policy Review team will be drawn from Headquarters (HQUSACE), the MSC, the Planning Centers of Expertise, and other review resources as needed.

    - The Policy Review Team will be invited to participate in milestone meetings as well as other key meetings held during the development of decision documents (e.g., In-Progress Reviews, Issue Resolution Conferences, etc.).

    - Input from the Policy Review team should be documented in a Memorandum for Record (MFR) produced for each engagement with the team. The MFR should be distributed to all meeting participants.

    - As appropriate, PDTs should capture policy review input in the study risk register. Those items should be addressed/discussed at future meetings until the issues are

resolved. Any key decisions pertaining to risk or other considerations should be documented in a MFR.

2) **Legal Review.** A representative(s) from Office of Counsel (OC) will be assigned to participate on the policy and legal compliance review team. The OC member(s) may originate from the District, MSC, and/or HQUSACE. The MSC Chief of Planning and Policy will coordinate membership and participation with the office chiefs.

   - Legal review input may be captured in a MFR for a particular meeting or milestone or as a separate legal memorandum.

   - OC will determine how to document legal review input provided for each study/project.

ATTACHMENT 1: TEAM ROSTERS

Table 1: Project Delivery Team

PROJECT DELIVERY TEAM			
Name	**Office**	**Position**	**Phone Number**
Corps of Engineers			
Pam Castens	CESAW-PM-D	Project Manager	(910) 251-4671
Matt Schrader	CESAJ-PD-D	Plan Formulation	(904) 232-2043
Kristina May	CENAB-PLP	Environmental	(410) 962-6100
Idris Dobbs	CESAJ-PD-D	Economics	(904) 232-1053
Kelly LeGault	CESAJ-EN-WC	Engineering	(904) 232-1861
Clay McCoy	CESAJ-PM-W	Regional Sediment Mgmnt	(904) 232-3657
Lisa Clark	CESAJ-PM	Outreach	(904) 232-2114
Carolyn Devita Tooley	CESAJ-OC	Assistant District Counsel	(904) 232-172

Table 2: District Quality Control Team

DISTRICT QUALITY CONTROL TEAM			
Name	**Office**	**Position**	**Phone Number**
TBD	Plan Formulation		
TBD	Geospatial		
TBD	Environmental		
TBD	Economics		
TBD	HH&C		
TBD	Cost Engineering		
TBD	Geotechnical Engineering		
TBD	Civil Engineering		
TBD	Risk		
TBD	Real Estate		

Table 3: Agency Technical Review Team

AGENCY TECHNICAL REVIEW TEAM			
Name	**Office**	**Position**	**Phone Number**
Amy Guise	CENAB-PL	ATR Lead	(410) 962-6138
TBD		Plan Formulation - CSRM	
Cindy Tejeda	CESPD-PDP	Plan Formulation - Watershed	(415)503-6591
TBD		Economics	
TBD		Environmental Resources	
TBD		Cultural Resources	
TBD		Geospatial	
TBD		Hydrology, Hydraulics and Coastal Engineering	
TBD		Civil Engineering	
TBD		Cost Engineering	
TBD		Risk	
Will Veatch	CEMVN-ED-H	Climare Preparedness and Resilience	(504) 862-2858
TBD		Real Estate	

Table 4: Vertical Team

VERTICAL TEAM			
Name	**Office**	**Position**	**Phone Number**
Bradd Schwichtenberg	CEMP-SAD-RIT	Deputy Chief SAD/SPD RIT	(202) 761-1367
Eric Bush	CESAD-PDP	Chief, Planning and Policy Division	(404) 562-5220
Dylan Davis	CESAD-PDO	Coastal Program Manager for Navigation and Flood Risk Management	(404) 562-5130
Neil Purcell	CECC-SAD	Division Counsel	(404) 562-5015
Lee Danley	CESAD-RBT	Senior Cost Engineer	(404)562-5109

Table 5: Policy and Legal Review Team

POLICY and LEGAL REVIEW TEAM			
Name	**Office**	**Position**	**Phone Number**
Wilbert Paynes	CESAD-PD	Review Manager	(202) 761-5220
Naomi Altschul	CECW-PC	Economics	(917) 359-2819
Debby Scerno	CESAD-PDP	Environmental	(404) 562-5227
Jeff Lin	CECW-PC	Plan Formulation	(202) 761-5220
Kate White	CECW-EC	Climate Preparedness and Resilience	(202) 761-4163
Mike Wolz	CESAD-RBT	E&C	(404) 562-5120
Marcia DeVille	CEMP-CR	Real Estate	(202) 761-7238
Neil Purcell	CECC-SAD	Office of Counsel	(404) 562-5015

Table 6: Coastal Hazard System Technical Oversight Group

COASTAL HAZARD SYSTEM TECHNICAL OVERSIGHT GROUP		
NAME	**AFFILIATION**	**EMAIL**
Mary Cialone	USACE	Mary.A.Cialone@usace.army.mil
Julie Rosati, PhD	USACE	Julie.D.Rosati@usace.army.mil
Lynn Bocamazo	USACE	Lynn.M.Bocamazo@usace.army.mil
John Winkelman	USACE	John.H.Winkelman@usace.army.mil
Will Veatch	USACE	William.C.Veatch@usace.army.mil
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Tucker Mahoney	FEMA	Tucker.Mahoney@fema.dhs.gov
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Casey Dietrich, PhD	NC State	jcdietri@ncsu.edu
Beth Sciaudone, PhD	NC State	ejsciaud@ncsu.edu
Brian Blanton, PhD	UNC Chapel Hill	Brian_blanton@renci.org
Jen Irish, PhD	Virginia Tech	jirish@vt.edu
Don Resio, PhD	Univ. of North Florida	don.resio@unf.edu
Jack Puleo, PhD	University of Delaware	jpuleo@udel.edu
Nobu Kobayashi, PhD	University of Delaware	nk@udel.edu
Bruce Ebersole	Jackson State University	bruce.a.ebersole@jsums.edu
Scott Douglass, PhD	Univ. of South Alabama	sdouglass@southalabama.edu
Dirk-Jan Walstra, PhD	TU Delft	DirkJan.Walstra@deltares.nl
Nicole Elko, PhD	CERB	Nicole.elko@asbpa.org
Brian Batten, PhD	Dewberry	BBatten@dewberry.com

Table 7: External Subject Matter Expert Panel

EXTERNAL SUBJECT MATTER EXPERT PANEL (Attendees to be added/confirmed)		
NAME	**AFFILIATION**	**EMAIL**
TBD	Rockefeller Foundation	
Jon Miller	Stevens Institute of Technology	jmiller@stevens.edu
Alan Blumberg	Jupiter	info@jupiterintel.com
Bret Webb	University of South Alabama	bwebb@southalabama.edu
Michael Bruno	University of Hawaii	mbruno2@hawaii.edu
Casey Dietrich	NC State	jcdietri@ncsu.edu
Kara Doran	USGS	kdoran@usgs.gov
Hilary Stockdon	USGS	hstockdon@usgs.gov
Spencer Rogers	NC Sea Grant	smrogers@ncsu.edu
Doug Piatkowski/Leighann Brandt	BOEM	douglas.piatkowski@BOEM.gov

Table 8: Internal Subject Matter Expert/Communities of Practice Team

INTERNAL SUBJECT MATTER EXPERTS/COMMUNITIES OF PRACTICE		
NAME	**AFFILIATION**	**EMAIL**
Will Veatch	Climate Preparedness and Resilience CoP	William.C.Veatch@usace.army.mil
John Winkelman	Hydrology, Hydraulics and Coastal CoP	John.H.Winkelman@usace.army.mil
Bill Bolte	Cost MCX	William.G.Bolte@usace.army.mil
TBD	Environmental CoP	
TBD	Geotech CoP	
Donald Cresitello	PCX-CSRM	Donald.E.Cresitello@usace.army.mil
Jason O'Neal	GIS CoP	Jason.A.O'neal@usace.army.mil